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# HEAVY GRAIN EXPORTS IN VOYAGE-CHARTERED SHIPS

## rates and volume

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## SUMMARY

Approximately 70 percent of the heavy grains--corn, wheat, and soybeans--exported from North America between 1961 and 1965 were shipped on tramp steamers under voyage charters. During this period tramp steamer rates for heavy grain were quite variable. For most origin-destination couplets, or trades, the highest rates occurred in the second halves of 1963 and 1964, and the lowest occurred in the second half of 1962.

Tramp shipping of U.S. grain under voyage charter is divided into two markets. One is composed of U.S.-flag vessels competing with each other for the 50 percent of the Government-sponsored grain cargoes which the Cargo Preference Act of 1954 (68 Stat. 832) guarantees them; the other is made up of foreign-flag vessels competing for private grain shipments and the remaining portion of the Government-sponsored grain cargoes. The rates charged by U.S.-flag vessels are so much higher than those of foreign-flag vessels that no direct competition exists between the two markets. U.S.-flag vessels--with one exception--were found only in those trades where large quantities of U.S. Government-sponsored grain move. The rates of foreign-flag vessels are somewhat interdependent, with the rates for trades originating in U.S. Gulf ports, through which the largest volume of export grain moves, frequently serving as price setters for foreign-flag vessels serving all ports.

Although distance is a factor in determining rates, the major determinant appears to be the short-run relationships between the supply of shipping available for grain cargoes and the demand for such shipping.

With few exceptions, tramp steamer rates for heavy grains showed rising trends during 1961-65, with rates of U.S.-flag vessels exhibiting the steepest rises.



# HEAVY GRAIN EXPORTS IN VOYAGE-CHARTERED SHIPS: RATES AND VOLUME

By T. Q. Hutchinson, Industry Economist  
Marketing Economics Division  
Economic Research Service

## INTRODUCTION

Between 1961 and 1965, the United States exported 165 million long tons of heavy grain--corn, wheat, and soybeans. 1/ The average value of this trade was about \$2 billion annually, approximately half from wheat exports alone.

The cost of shipping grain by ocean freight has a marked influence on the competitive position of the United States in world grain markets. Also, differences in rates affect the competitive positions of the various coasts as shipping points, and the interregional competition of the producing areas. However, the free market nature of ocean freight rates for bulk commodities makes it difficult to obtain information on the general level of rates for grain shipments, their behavior over time, and the degree to which shipping rates from one coast affect shipping rates from the other coasts. The U.S. Department of Agriculture conducted this study to provide such information. In it, the causes of rate fluctuations were explored and a general theory of rate behavior was developed.

## BACKGROUND

Ocean carriers of grain cargoes can be divided into two groups: tramp steamers and liners. 2/ Liners publish rates for manufactured goods and for small quantities of bulk commodities. Their rates for large quantities of bulk commodities are termed open rates and are determined by negotiation between the ship owners and prospective shippers. These carriers usually offer a scheduled service, called berth or liner service, with regular ports-of-call; the bulk commodities which they carry are known as liner parcels.

Ocean carriers offering irregular service with no fixed ports-of-call are known as tramp steamers, or tramps. Bulk commodities, such as grain, coal, and fertilizers, are their chief cargoes. Their rates are determined by negotiations between the shipper and the carrier, with a shipbroker usually serving as an intermediary. The agreement that stems from these negotiations is referred to as a charter party.

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1/ Long tons (2,240 pounds) are commonly used in oceanborne commerce.

2/ Liners do not refer to passenger ships or services.

## Charter Parties

There are three basic charter parties: demise or bareboat charters, time charters, and voyage charters. In most instances, the direct transportation cost paid by grain exporters is the voyage charter rate. Voyage charters provide for the use of a vessel for one or more voyages between specified points. The voyage charter party is a contract which sets forth not only the kind and quantity of goods to be carried and the rate at which they will be carried, but also shows who will bear each of the many costs of transporting and handling goods by ocean vessel.

Time charters provide for the use of a vessel for a specified length of time, usually from 1 to 3 years. Under a time charter, the charterer may use the vessel in his own enterprise or recharter it under a voyage charter. Demise charters are the least used. <sup>3/</sup> They are contracts for the use of a bareboat, and the charterer is required to man and provision the vessel and perform the other functions of the shipowner.

## Grain-Carrying Ships

Ships of various sizes and descriptions are voyage chartered to carry grain cargoes; however, two types predominate in the grain trade--bulk carriers and tankers. Bulk carriers may be further subdivided into large and small vessels. The small vessels are usually Liberty- or Victory-ship types of about 10,000 deadweight tons. <sup>4/</sup> These vessels were built as general cargo ships but are suitable for carrying grain. Large bulk carriers are ships designed to carry dry bulk cargoes; many have self-unloading gear, and a few have self-trimming gear. They are usually substantially larger than general cargo ships with deadweight tonnages of between 15,000 and 20,000 tons.

Tankers are specialized bulk carriers. Although designed for liquid cargoes, they are also suitable for free-flowing grain cargoes. Some tankers have been constructed or converted to facilitate the unloading of grain. They range in size from about 16,000 deadweight tons to more than 100,000 deadweight tons.

## The Cargo Preference Act

Under the provisions of the Cargo Preference Act of 1954 (68 Stat. 832), at least 50 percent of all grain exports sponsored by the Government must be carried on U.S.-flag vessels. Foreign-flag ships compete for the remainder of these Government-financed shipments and for private cargoes.

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<sup>3/</sup> McDowell, C. E., and Gibbs, Helen M. Ocean Transportation. McGraw Hill Book Co., Inc., New York, N.Y., 1954, p. 187.

<sup>4/</sup> Deadweight tons--the carrying capacity of a ship in long tons (2,240 pounds).

## METHODOLOGY

The study covered the years 1961-65 and was limited to shipments of heavy grain in voyage-chartered tramp steamers, the principal carriers of grain cargoes. 5/ The lighter grains--chiefly, oats, barley, and rye--were not included because their erratic movement and significantly higher rates per ton would have caused excessive fluctuations of the data. Fixtures reported for cargoes of less than 5,000 long tons were also excluded. 6/ These fixtures are infrequently reported and are likely to cover relief cargoes which do not move in the usual export grain trade.

### Grouping Procedure

Since data were not available on a port-to-port basis, both origin and destination ports included in the study were arranged into groupings commonly used by the shipping industry (table 1). For example, all major ports north of Cape Hatteras were designated North Atlantic ports. Similarly, the Belgian port of Antwerp and the Netherlands ports of Rotterdam and Amsterdam were grouped together as Antwerp-Rotterdam-Amsterdam, or A-R-A, for the purpose of determining average rate schedules. Thus, a shipment from any North Atlantic port to any A-R-A port customarily carries the same rate. This is in keeping with the domestic inland transportation rate structure which tends to equalize rail rates from terminal markets to the major ports on a seacoast.

No averages were computed for the Atlantic coast ports south of Cape Hatteras. Charleston, S.C., was the only such port to report any grain shipments. Its exports in tramp ships totaled only 54,700 long tons in 1964 and 63,500 long tons in 1965.

### Selection of Rates

Rate quotations were obtained from a variety of sources and represent fixtures reported in New York and London, the centers of ship chartering. Quotations were sorted by the origin-destination couplets, or "trades," used in the study and further sorted to segregate U.S.-registry ships in those couplets where they were found.

Because of the large number of voyage charter terms available, this study does not attempt to show the cost levels associated with each combination. Moreover, no effort was made to analyze liner parcel rates, since so few were available during the period of the study. Nevertheless, it is probable that the liner parcel rates for bulk cargoes are not significantly

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5/ Since preparation of this report, additional data have become available. These are shown in appendix 2, tables 18-25, but are not evaluated.

6/ The chartering of a vessel is referred to as fixing a vessel by the trade. The pertinent data relating to the charter are usually termed a fixture.

Table 1.--Origin and destination ports for heavy grain shipments in voyage-chartered ships

Origin ports	Destination ports
Great Lakes <u>1</u> / .....	Antwerp-Rotterdam-Amsterdam United Kingdom
St. Lawrence <u>2</u> / .....	Antwerp-Rotterdam-Amsterdam United Kingdom
North Atlantic .....	United Kingdom Antwerp-Rotterdam-Amsterdam North Africa
U.S. Gulf .....	Antwerp-Rotterdam-Amsterdam United Kingdom Japan East Coast of India West Coast of India Brazil North Africa
North Pacific <u>3</u> / .....	Japan East Coast of India West Coast of India

1/ Includes Canadian and American ports on the Great Lakes and Churchill, Canada, on Hudson Bay.

2/ Includes ports on St. Lawrence River and Gulf of St. Lawrence; St. John, New Brunswick; and Halifax, Nova Scotia.

3/ Includes U.S. ports north of San Francisco and British Columbia ports.

different from voyage charter party rates, since both are discovered in a free market atmosphere. The few rates that were available for liner parcels seem to bear out this assumption.

#### Weighting Procedure

The rate shown in each quotation for a couplet or subcouplet grouping was weighted by the tonnage associated with that rate and aggregated on a quarterly basis to form a weighted average (appendix tables 10-17). Whenever the quotations allowed for a range in tonnage, the lowest tonnage shown was used. The quantities shown moving by tramp ships are, therefore, somewhat understated, though by less than 5 percent. These weighted averages are referred to as average rates, or rates, in the remainder of the study.



In many instances, the quotations used provided for optional origins or destinations. There was no way to determine which option was exercised. In all instances, optional rates were aggregated with principal rates to calculate the average rates referred to above.

## ANALYSIS OF GRAIN SHIPMENTS AND RATES

The importance of irregular carriers to the U.S. grain export trade can be seen in table 2. Since 1961, 70 percent of all heavy grain exported from the North American continent is reported to have moved in voyage-chartered ships. However, in both 1961 and 1964--the 2 years showing the smallest percentage of movement by tramp ships--time charter rates were significantly higher than their usual levels. While most of this rise in time charter rates can probably be attributed to the augmenting of regular ocean carrier fleets with time-chartered vessels, some of the increase resulted from the hiring of vessels on a time-charter basis by grain companies. Grain moving in these vessels is not reflected in the volume data used in this study.

### Great Lakes Ports

In the years 1961-65, only a relatively small part of grain exports through the Great Lakes and St. Lawrence ports moved in voyage-chartered ships (table 3). The trend through 1965 at these ports was for total traffic to increase while the quantity carried in chartered ships remained relatively constant or decreased slightly, thus reducing the percentage of grain moving under voyage charter. This implies that liner parcels or private shipments were frequently used at these ports.

Most of the U.S. grain exported through the Great Lakes represented private sales. The provisions of the Cargo Preference Act of 1954 did not apply to such sales; thus, no U.S.-registered vessels were observed in this part of the study.

### Antwerp-Rotterdam-Amsterdam

Average rates per long ton to Antwerp-Rotterdam-Amsterdam from the Great Lakes ranged from a low of \$6.29 in the third quarter of 1962 to a high of \$10.59 in the fourth quarter of 1963 (fig. 1). In the fourth quarter of 1965, rates averaged only 8 cents below the 1963 peak.

Shipments from the Great Lakes showed a clear seasonal pattern, with the largest volume moving in the second and third calendar quarters (table 4). Rates to Antwerp-Rotterdam-Amsterdam reflected this seasonality. During the first and fourth quarters, they averaged about \$1 higher than during the second and third quarters.

Table 2.--Heavy grain exports from the United States and Canada, 1961-65

[illegible]

Sources: U.S. data (1961-63) are based on Waterborne Commerce of the United States, Part 5, U.S. Corps of Engineers, 1961-63. U.S. data (1964-65) are based on Grain Market News, U.S. Dept. Agr., Vol. 13, No. 2, January 15, 1965; Grain Market News, U.S. Dept. Agr., Vol. 14, No. 2, January 14, 1966. Canadian data are based on Summary of Canadian Grain Movement, Statistics Branch, Board of Canadian Grain Commissioners, 1961-65 (weekly).

Table 3.--Heavy grain exports from Great Lakes and St. Lawrence ports, by countries, 1961-65

Years	United States	Canada	Shipped in voyage- chartered vessels:
		<u>1,000 long tons</u>	
1961 .....	3,426	4,762	4,844
1962 .....	4,056	4,094	4,640
1963 .....	4,846	6,562	6,669
1964 .....	5,289	8,042	5,820
1965 .....	6,154	7,769	7,206

Sources: U.S. data (1961-63) are based on Waterborne Commerce of the United States, Part 5, U.S. Corps of Engineers, 1961-63. U.S. data (1964-65) are based on Grain Market News, U.S. Dept. Agr., Vol. 13, No. 2, January 15, 1965; Grain Market News, U.S. Dept. Agr., Vol. 14, No. 2, January 14, 1966. Canadian data are based on Summary of Canadian Grain Movement, Statistics Branch, Board of Canadian Grain Commissioners, 1961-65 (weekly).

## United Kingdom

Average rates to the United Kingdom ranged from a low of \$5.98 per long ton in the third quarter of 1962 to a high of \$14.00 in the fourth quarter of 1963. Rates showed the same seasonal pattern as that shown for rates to Antwerp-Rotterdam-Amsterdam, except that seasonality was even more marked for the United Kingdom (fig. 1). The first and fourth quarter rates were on the average more than \$2 higher than those for the second and third quarters.

### St. Lawrence Ports

Although most of the ports in the St. Lawrence grouping are Canadian, sizable quantities of U.S. grain move through them. Most of this grain is used to top off ships which are loaded to less than their capacity in the Great Lakes, where the limited depth of lock sills in the St. Lawrence Seaway necessitates partial loading.

Most of the U.S. grain shipped through St. Lawrence ports, like that shipped through the Great Lakes ports, represents private sales carried on foreign-flag vessels. The provisions of the Cargo Preference Act do not apply to these shipments, and no U.S.-registered vessels were reported.

### Antwerp-Rotterdam-Amsterdam

Average rates to Antwerp-Rotterdam-Amsterdam from St. Lawrence ports ranged from a low of \$2.75 per long ton in the third quarter of 1962 to \$6.87 in the fourth quarter of 1963 (fig. 2).

Exports of heavy grain from St. Lawrence ports to Antwerp-Rotterdam-Amsterdam were increasing during the period studied. For the most part they

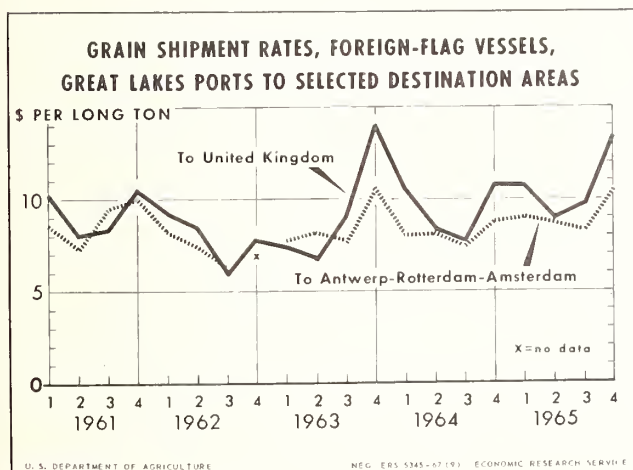


Figure 1

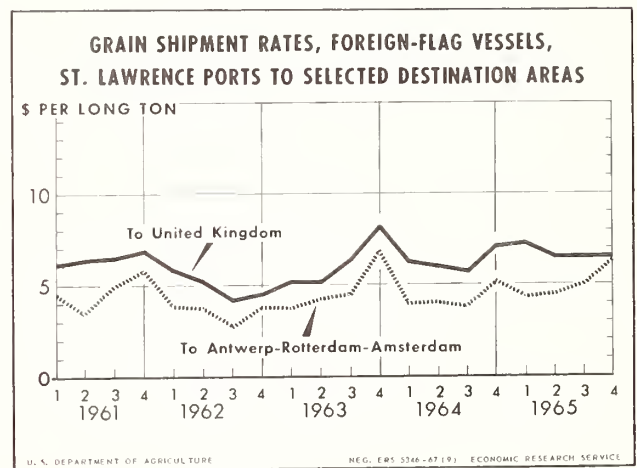


Figure 2

Table 4.--Great Lakes origins: Heavy grain shipments in voyage-chartered vessels to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas	
	United Kingdom	Antwerp-Rotterdam-Amsterdam
	----- Long tons -----	
1961:		
1st quarter .....	170,800	124,300
2nd quarter .....	40,000	448,900
3rd quarter .....	141,800	571,300
4th quarter .....	63,700	53,300
Total .....	416,300	1,197,800
1962:		
1st quarter .....	103,600	101,900
2nd quarter .....	223,500	416,550
3rd quarter .....	205,800	590,725
4th quarter .....	108,215	---
Total .....	641,115	1,109,175
1963:		
1st quarter .....	29,600	45,000
2nd quarter .....	234,000	222,550
3rd quarter .....	332,100	317,070
4th quarter .....	20,100	197,400
Total .....	615,800	782,020
1964:		
1st quarter .....	8,500	92,800
2nd quarter .....	171,500	312,500
3rd quarter .....	221,250	413,300
4th quarter .....	37,700	212,000
Total .....	438,950	1,030,600
1965:		
1st quarter .....	42,400	42,000
2nd quarter .....	191,000	458,300
3rd quarter .....	189,200	689,750
4th quarter .....	17,300	42,000
Total .....	439,900	1,232,050



showed the same seasonality as Great Lakes exports (table 5). The average difference in rates between the first and fourth quarters and the second and third quarters in the 5-year period was \$0.77.

Rates to Antwerp-Rotterdam-Amsterdam from St. Lawrence ports averaged about \$4 less than rates from Great Lakes ports to the same destination. For 1961 and 1962, this difference might be explained by the much larger volume exported from the Great Lakes, but in 1963 this relationship was reversed. In 1964, St. Lawrence ports accounted for about 166,000 long tons more than Great Lakes ports, and in 1965, for nearly twice the volume. Apparently the rate differential cannot be accounted for by difference in volume. A more likely explanation is that a voyage from St. Lawrence ports to Europe or the British Isles takes about one-half the time required for a similar voyage from the Great Lakes.

#### United Kingdom

Average rates to the United Kingdom from St. Lawrence ports ranged from a low of \$4.19 per long ton in the third quarter of 1962 to a high of \$8.19 in the fourth quarter of 1963 (fig. 2).

Seasonal export and rate patterns shown by the other Great Lakes and St. Lawrence originating trades are also evident in the St. Lawrence to United Kingdom trade. First and fourth quarter rates averaged \$0.57 more than second and third quarter rates.

#### North Atlantic Ports

The volume of heavy grain shipped in voyage-chartered vessels from North Atlantic ports also shows a definite seasonal pattern (table 6). Except in 1964 when a dock strike greatly reduced the number of shipments in the fourth quarter, the greatest volumes were shipped in the first and fourth calendar quarters. Indeed, in both 1963 and 1964 two trades showed no shipments in the second quarter.

The periods of peak volumes shipped coincided with the periods during which the Great Lakes were closed to navigation. It seems likely that much of this grain would move through the Great Lakes ports if they were open throughout the year.

#### Antwerp-Rotterdam-Amsterdam and United Kingdom

Most of the heavy grain exports from North Atlantic ports to the United Kingdom and Antwerp-Rotterdam-Amsterdam represented private sales and were not subject to the Cargo Preference Act. Shipments by U.S.-flag vessels were found in only one calendar quarter of the study, the second quarter of 1961. The relatively high rates charged by these vessels are not reflected in figure 3.

Table 5.--St. Lawrence origins: Heavy grain shipments in voyage-chartered vessels to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas	
	United Kingdom	Antwerp-Rotterdam- Amsterdam
	<u>Long tons</u>	
1961:		
1st quarter .....	208,910	115,750
2nd quarter .....	208,100	75,500
3rd quarter .....	185,300	76,300
4th quarter .....	127,250	191,000
Total .....	729,560	458,550
1962:		
1st quarter .....	184,700	29,500
2nd quarter .....	464,500	158,600
3rd quarter .....	319,950	203,800
4th quarter .....	284,380	132,700
Total .....	1,253,530	524,600
1963:		
1st quarter .....	257,900	29,800
2nd quarter .....	548,750	439,000
3rd quarter .....	381,800	1,193,850
4th quarter .....	272,850	114,500
Total .....	1,461,300	1,777,150
1964:		
1st quarter .....	29,600	21,000
2nd quarter .....	152,900	437,550
3rd quarter .....	352,200	439,900
4th quarter .....	176,900	298,200
Total .....	711,600	1,196,650
1965:		
1st quarter .....	245,100	416,900
2nd quarter .....	599,800	742,300
3rd quarter .....	238,600	492,000
4th quarter .....	66,050	88,250
Total .....	1,149,550	1,739,450

Table 6.--North Atlantic origins: Heavy grain shipments in voyage-chartered vessels to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas		
	United Kingdom	:Antwerp-Rotterdam-: : Amsterdam :	North Africa
	<u>Long tons</u>		
1961:			
1st quarter ....	292,150	60,500	36,000
2nd quarter ....	59,700	32,500	14,000
3rd quarter ....	236,450	12,000	69,600
4th quarter ....	478,500	125,030	194,400
Total .....	1,066,800	230,030	314,000
1962:			
1st quarter ....	588,550	167,500	128,400
2nd quarter ....	55,300	49,500	41,000
3rd quarter ....	99,500	67,900	73,100
4th quarter ....	315,700	120,100	338,500
Total .....	1,059,050	405,000	581,000
1963:			
1st quarter ....	334,900	75,500	262,200
2nd quarter ....	---	---	50,000
3rd quarter ....	391,100	58,500	40,000
4th quarter ....	303,350	81,300	219,800
Total .....	1,029,350	215,300	572,000
1964:			
1st quarter ....	234,600	136,000	66,500
2nd quarter ....	---	---	---
3rd quarter ....	77,000	29,500	463,000
4th quarter ....	318,200	143,200	---
Total .....	629,800	308,700	529,500
1965:			
1st quarter ....	259,100	240,500	108,900
2nd quarter ....	34,200	---	22,000
3rd quarter ....	205,300	128,500	33,400
4th quarter ....	351,100	238,000	35,000
Total .....	849,700	607,000	199,300

Average foreign-flag rates to Antwerp-Rotterdam-Amsterdam varied from a high of \$7.88 in the second quarter of 1961 to a low of \$2.94 in the third quarter of 1962. Except in the second and third quarters of 1961, they were below the rates to the United Kingdom, which ranged from \$7.65 in the second quarter of 1961 to a low of \$4.02 in the third quarter of 1962.

Rates in these trades were noticeably lower than corresponding rates from Great Lakes ports. This is to be expected, since the Great Lakes ports are generally more distant from the European continent than North Atlantic ports, and ships leaving the Great Lakes are subject to tolls and delays on the St. Lawrence Seaway.

### North Africa

A large part of the grain shipped from North Atlantic ports to North Africa in 1961-65 was wheat exported under Public Law 480 to the United Arab Republic. Because this wheat and much of the other grain moving to North Africa was subject to the provisions of the Cargo Preference Act, U.S.-flag vessels were active in this trade.

Average rates for U.S.-flag vessels varied from \$13.25 in the second quarter of 1964 to \$14.40 in the fourth quarter of 1965 (fig. 4). Average rates for foreign-flag shipments varied from \$4.34 in the third quarter of 1962 to \$11.00 in the fourth quarter of 1963. During 1961-65, the quarterly differences between U.S.-flag and foreign-flag rates averaged \$7.40.

The two sets of rates do not appear to be related. Foreign-flag rates exhibited the drop in 1962 and the rise in 1963 which were characteristic of foreign-flag rates in general. U.S.-flag rates were more stable and showed their greatest decline in the second quarter of 1964.

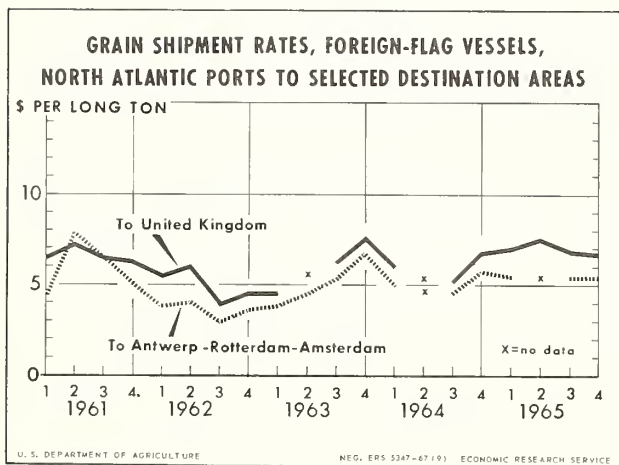


Figure 3

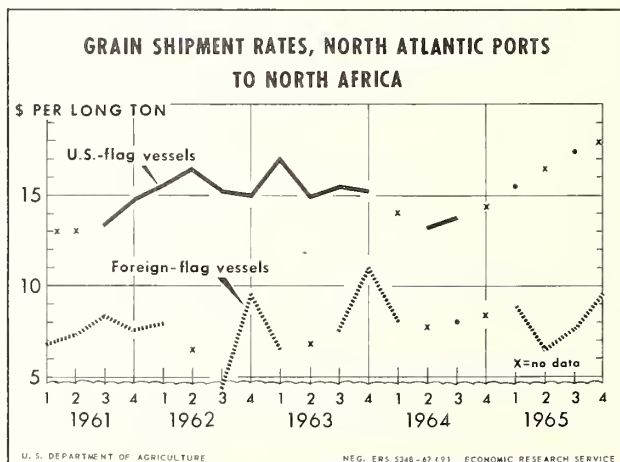


Figure 4



## U.S. Gulf Ports

The U.S. Gulf ports are the most active participants in the export grain trade. Antwerp-Rotterdam-Amsterdam, the United Kingdom, Japan, India, Brazil, and North Africa are the chief destinations of heavy grain moving through these ports (table 7).

U.S.-flag and foreign-flag vessels were used for heavy grain shipments from Gulf ports to India, Brazil, and North Africa during 1961-65, but only foreign-flag shipments were made from these ports to the United Kingdom, Antwerp-Rotterdam-Amsterdam, and Japan.

### Antwerp-Rotterdam-Amsterdam

Average rates to Antwerp-Rotterdam-Amsterdam for heavy grain shipments from U.S. Gulf ports ranged from \$3.51 per long ton in the third quarter of 1962 to \$6.84 in the fourth quarter of 1963 (fig. 5). These were the lowest rates found for U.S. Gulf ports, and were generally lower than comparable rates from the Great Lakes, St. Lawrence, and North Atlantic ports. However, there was a rising trend in rates from the U.S. Gulf ports which appeared to be diminishing the advantage of these ports over Great Lakes and St. Lawrence ports. This was one of the few trends found in the study that was significantly related to time.

### United Kingdom

Average foreign-flag rates from the U.S. Gulf to the United Kingdom ranged from a low of \$4.21 in the third quarter of 1962 to a high of \$9.88 in the third quarter of 1965.

As shown in figure 5, rates to the United Kingdom generally followed the same pattern as those to Antwerp-Rotterdam-Amsterdam. During 1961, however, the two rates moved in opposite directions.

### Japan

Japan lies about 5,000 nautical miles farther from the U.S. Gulf ports than either Antwerp-Rotterdam-Amsterdam or the United Kingdom. This difference in distance appeared to be reflected in the substantially higher rates to Japan.

Average foreign-flag rates to Japan ranged from \$6.80 in the fourth quarter of 1962 to \$13.37 in the fourth quarter of 1964 (fig. 6).

The 5-year pattern of rates in this trade--a trough in the second half of 1962, a sharp rise to a peak in the fourth quarter of 1963, and another sharp rise in the fourth quarter of 1964--was similar to the 5-year pattern of foreign-flag rates in other trades. However, the rates to Japan did not exhibit the typical frequent short-term changes in trend. The relative stability of these rates may be attributed partly to the withholding of shipments by Japanese buyers when space on cargo ships is in short supply.

Table 7.--U.S. Gulf origins: Heavy grain shipments in voyage-chartered vessels to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas						
	United Kingdom	Antwerp-Rotterdam-Amsterdam	Brazil	Japan	East Coast of India	West Coast of India	North Africa
	Long tons						
1961:							
1st quarter ..	123,400	688,800	277,400	405,100	9,500	148,000	48,000
2nd quarter ..	39,100	707,100	349,300	380,500	22,000	129,800	53,500
3rd quarter ..	46,000	1,342,300	348,870	159,100	29,000	114,900	209,500
4th quarter ..	102,250	1,154,450	261,000	566,700	32,500	15,000	603,300
Total .....	310,750	3,892,650	1,236,570	1,511,400	93,800	506,800	914,300
1962:							
1st quarter ..	93,550	995,100	79,900	702,200	86,500	234,300	466,900
2nd quarter ..	249,800	827,000	343,900	314,400	101,000	488,300	391,200
3rd quarter ..	284,750	1,029,850	376,850	381,580	241,650	314,500	133,500
4th quarter ..	127,300	1,145,550	209,200	559,800	79,500	364,600	172,000
Total .....	755,400	3,997,500	1,009,850	1,957,980	508,650	1,401,700	1,163,600
1963:							
1st quarter ..	77,200	892,450	225,600	589,500	21,000	322,700	156,950
2nd quarter ..	60,300	885,950	223,200	566,800	109,700	432,400	97,500
3rd quarter ..	103,500	2,052,100	173,800	945,970	67,950	433,200	317,000
4th quarter ..	161,200	1,043,850	189,600	1,155,000	28,500	555,750	186,800
Total .....	402,200	4,874,350	812,200	3,257,270	227,150	1,744,050	758,250
1964:							
1st quarter ..	80,800	872,000	201,700	401,500	139,000	332,200	342,900
2nd quarter ..	69,700	1,075,900	365,100	310,500	95,000	860,833	132,200
3rd quarter ..	21,500	1,521,500	560,300	1,038,500	32,500	1,593,100	318,800
4th quarter ..	46,000	856,156	212,900	576,080	20,000	1,398,050	192,700
Total .....	218,000	4,325,556	1,340,000	2,326,580	286,500	4,184,183	986,600
1965:							
1st quarter ..	29,500	1,267,550	20,800	857,456	---	804,062	319,200
2nd quarter ..	91,700	2,243,300	---	1,080,425	254,500	1,279,367	274,700
3rd quarter ..	44,500	2,125,500	236,700	1,429,900	109,050	1,267,700	413,000
4th quarter ..	62,800	1,604,100	349,500	681,600	116,500	1,322,450	78,100
Total .....	228,500	7,240,450	607,000	4,049,381	315,050	4,570,417	1,085,000

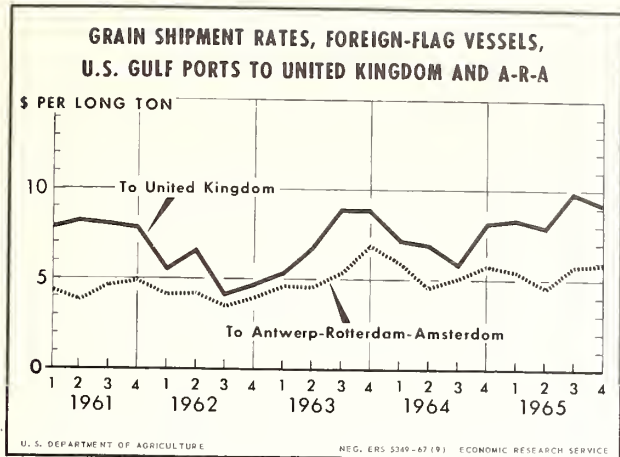


Figure 5

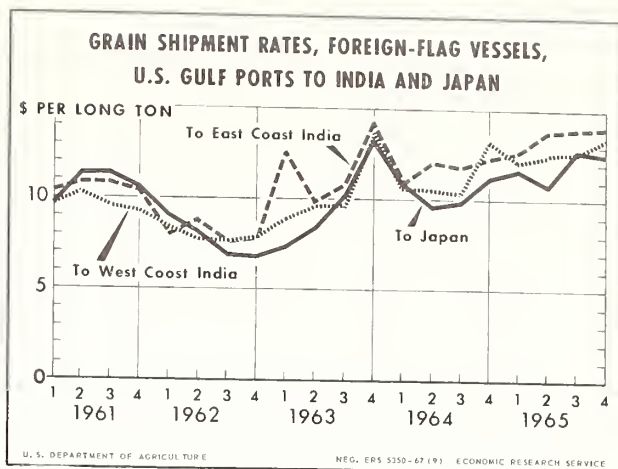


Figure 6

## India

Most of the heavy grain shipments from the United States to India from 1961-65 were financed under Public Law 480 and were subject to the Cargo Preference Act. Consequently, there were two very different rate levels, the upper level reflecting the high operating cost of U.S.-flag vessels.

U.S.-flag vessels.--Rates of U.S.-flag vessels from the U.S. Gulf to both East Coast and West Coast ports of India were among those which had significant trends. Rates to East Coast ports were the highest found in this study. Average rates ranged from \$23.85 in the second quarter of 1961 to \$31.25 in the fourth quarter of 1963 and \$31.37 in the first quarter of 1965 (fig. 7). The stability since the fourth quarter of 1963 seems to indicate that these rates have found a ceiling.

Rates to India's East Coast were higher on the average than rates to the West Coast, which varied from a low of \$15.20 in the second quarter of 1961 to a high of \$28.60 in the fourth quarter of 1965.

Figure 7 shows that, except in the fourth quarter of 1961 and the second quarter of 1965, U.S.-flag rates to the two Indian destination groupings closely resembled each other. In 1963, both turned sharply upward and remained high throughout 1964 and most of 1965.

As noted above, there were two sharp deviations from the pattern of similarity. In the fourth quarter of 1961, several charter parties to Kandla, a relatively high-cost port, caused average rates to the West Coast of India to rise dramatically. In the third quarter of 1965 in the West Coast of India

trade, the presence of many tankers, which generally command somewhat lower rates for grain cargoes than do dry cargo ships, resulted in a sharp decline in rates.

Some of the average rate difference between East and West Coast ports of India can be accounted for by the greater distance to the eastern coast of India, which is about 4,000 nautical miles farther from the U.S. Gulf than the western coast of India. Of more importance, however, is the relatively slow cargo discharge rate prevailing at the eastern ports. It should also be noted that ships of all flags calling at East Coast ports have an average capacity of 12,000 long tons--2,000 long tons less than those calling at West Coast ports. Since per ton operating costs of small ships are usually greater than those of their larger sisters, it is reasonable to assume that the differences in operating costs are reflected in the rates charged. <sup>7/</sup>

U.S.-flag rates to both the East and West Coasts of India were usually more than double the rates for foreign-flag vessels and increased more rapidly between 1961-65. In 1961 and 1962, rates for U.S.-flag vessels fluctuated far more severely than the corresponding foreign-flag rates. Beginning in the fourth quarter of 1963, U.S.-flag rates--particularly those to the East Coast of India--remained relatively stable, while foreign-flag rates fluctuated sharply.

Foreign-flag vessels.--The average foreign-flag rates from Gulf Coast ports to the East Coast of India ranged from \$7.53 in the third quarter of 1962 to \$14.32 in the fourth quarter of 1963 (fig. 6). Rates on shipments to the West Coast of India ranged from \$7.54 in the third quarter of 1962 to a high of \$13.54 in the fourth quarter of 1963. In common with most foreign-flag rates, average rates for Gulf Coast movements to both coasts of India showed a large trough in 1962, and rose to peaks in the latter halves of 1963 and 1964.

Over the 5-year period of the study, the pattern of foreign-flag rates for shipments from the U.S. Gulf to the West Coast of India resembled the pattern of U.S. Gulf-to-Japan rates. Neither trade exhibited the frequent short-term variations shown in most other trades.

Both Japan and the West Coast ports of India received much larger quantities of heavy grain from the U.S. Gulf than did India's East Coast ports. The difference in shipments to the East and West Coasts of India was even greater than is shown in table 7, since some of the tonnage shown as moving to the West Coast was actually unloaded at East Coast ports. This discrepancy is attributed to the manner in which charter parties are quoted.

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<sup>7/</sup> Ferguson, A. R., and others. The Economic Value of the United States Merchant Marine. Northwestern University, Evanston, Ill., 1961, p. 175.



U.S.-flag vessels.--Average U.S.-flag rates from the U.S. Gulf to Brazil ranged between \$12.38 in the second quarter of 1961 and \$20.00 in the second quarter of 1963 (fig. 8). U.S.-flag rates averaged \$19.91 and \$19.86 for the fourth quarters of 1963 and 1965, respectively.

The dip in both U.S.-flag and foreign-flag rates in the third quarter of 1962 was probably caused by the relatively large increase in the supply of shipping which occurred in that quarter.

The dip occurring in the second quarter of 1961 can also be seen in most of the U.S. Gulf trades in which Public Law 480 grain moves.

Foreign-flag vessels.--Foreign-flag rates from the U.S. Gulf to Brazil ranged from an average of \$5.46 in the third quarter of 1962 to a high of \$12.87 in the fourth quarter of 1963 (fig. 8). The pattern was typical of foreign-flag rates. The average difference between U.S.- and foreign-flag rates--about \$9--was much less than the difference between U.S.- and foreign-flag rates to India.

As might be expected, the U.S. Gulf was the only area which showed shipments of heavy grain to Brazil.

#### North Africa

While both U.S.- and foreign-flag rates to North Africa from the U.S. Gulf are higher than those from the North Atlantic ports, about twice as much heavy grain is exported to North Africa from the U.S. Gulf as from the North Atlantic ports.

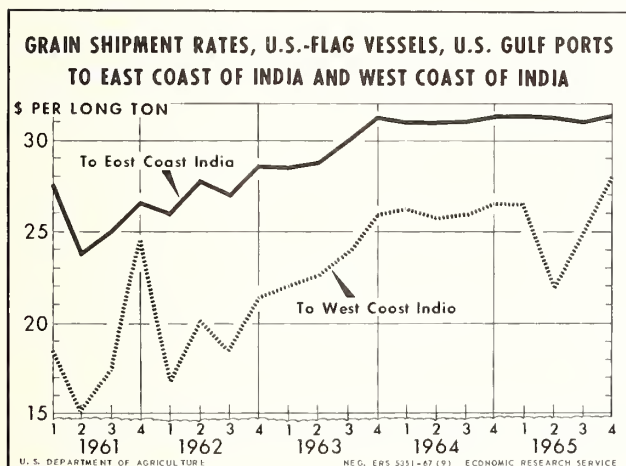


Figure 7

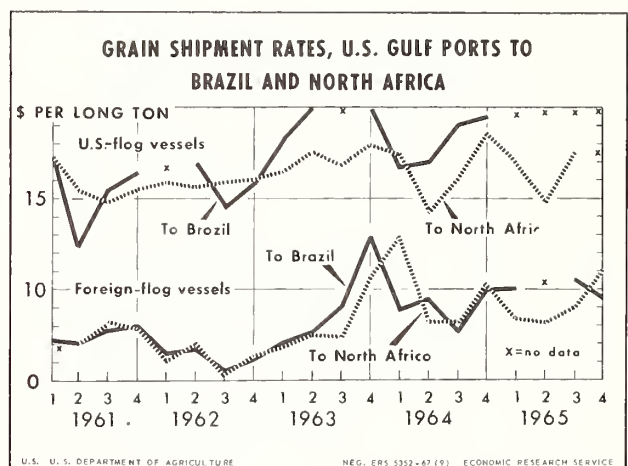


Figure 8

U.S.-flag rates from the U.S. Gulf to North Africa averaged twice as high as foreign-flag rates. They ranged from a low of \$14.25 in the second quarter of 1964 to a high of \$18.60 in the fourth quarter of 1964 (fig. 8). Their trend was more nearly level than the trend of U.S.-flag rates in other trades.

Foreign-flag rates from the U.S. Gulf to North Africa were subject to far more severe fluctuations than their U.S.-flag counterparts. During the period studied, they varied from a low of \$5.25 in the third quarter of 1962 to a high of \$12.89 in the first quarter of 1964 (fig. 8).

The profile shown in figure 8 is similar to that of most foreign-flag rates in this study.

### North Pacific Ports

Japan and India were the chief destinations for heavy grain moving through the North Pacific ports considered in this study. Great Britain and Mainland China are major markets for Canadian grain exported through Canada's Pacific Coast ports, but these destinations are excluded from table 8 because U.S. grain is unimportant or nonexistent in these two trades.

#### Japan

Most of the U.S. grain exported to Japan through the North Pacific ports in 1961-65 consisted of private shipments (table 8). The single movement in a U.S.-flag vessel in the first quarter of 1964 was, therefore, unexpected and is unexplained. Its rate, \$13.73 per long ton, is not reflected in the average rate shown in figure 9 for that quarter.

Average foreign-flag rates from the North Pacific ports to Japan ranged from \$4.57 in the third quarter of 1962 to \$8.44 in the third quarter of 1965. Rates from the North Pacific ports to Japan were much lower than from the U.S. Gulf, probably because Japan is about 5,000 nautical miles closer to the Pacific Coast than to the U.S. Gulf Coast.

The general level of rates from the North Pacific to Japan was below those to either the East Coast of India or the West Coast of India.

#### India

Most of the U.S. grain exported to India through U.S. Pacific Coast ports was financed under the terms of Public Law 480 and was, therefore, subject to provisions of the Cargo Preference Act.

East Coast.--U.S.-flag rates to the East Coast ports of India were the highest found for North Pacific origins. They were, however, substantially lower than the U.S.-flag rates from the U.S. Gulf to these ports.

In common with many trades, the North Pacific to East Coast of India trade exhibited high U.S.-flag rates in the fourth quarters of 1963, 1964,

Table 8.--North Pacific origins: Heavy grain shipments in voyage-chartered vessels to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas		
	Japan	East Coast of India	West Coast of India
	<u>Long tons</u>		
1961:			
1st quarter .....	216,500	134,200	118,000
2nd quarter .....	642,900	81,900	117,700
3rd quarter .....	566,150	104,000	76,000
4th quarter .....	415,750	86,500	33,500
Total .....	1,841,300	406,600	345,200
1962:			
1st quarter .....	472,400	63,000	20,000
2nd quarter .....	460,570	20,950	20,000
3rd quarter .....	553,950	103,000	89,000
4th quarter .....	274,400	98,500	50,000
Total .....	1,761,320	285,450	221,000
1963:			
1st quarter .....	453,674	402,800	179,000
2nd quarter .....	616,000	---	---
3rd quarter .....	1,275,500	214,350	173,750
4th quarter .....	397,900	126,600	87,500
Total .....	2,743,074	743,750	440,250
1964:			
1st quarter .....	341,800	127,500	91,000
2nd quarter .....	541,700	90,700	78,000
3rd quarter .....	648,700	24,700	---
4th quarter .....	486,630	82,300	126,900
Total .....	2,018,830	325,200	295,900
1965:			
1st quarter .....	836,099	113,000	218,500
2nd quarter .....	987,737	159,500	175,000
3rd quarter .....	605,498	74,000	165,000
4th quarter .....	324,500	251,300	347,500
Total .....	2,753,834	906,000	597,800

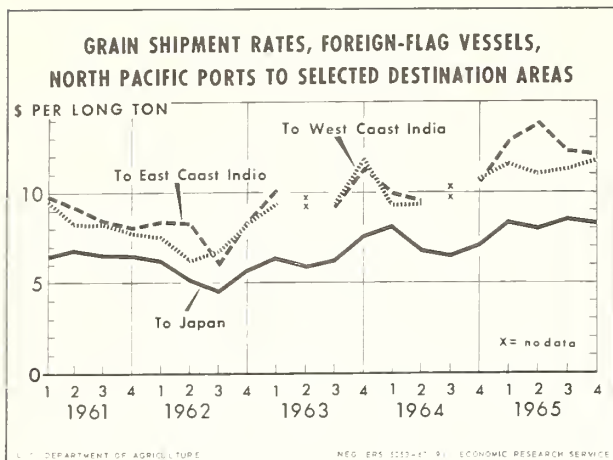


Figure 9

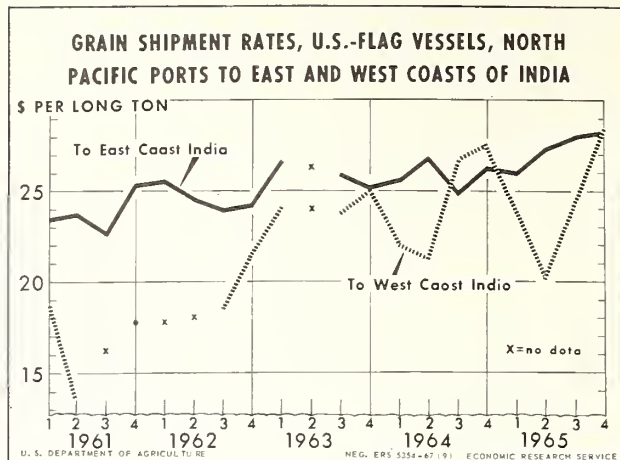


Figure 10

and 1965, while the lowest rates occurred in 1961 and in the second half of 1962 (fig. 10). The highest rate, however, occurred in the fourth quarter of 1965 after a continuous climb from the fourth quarter of 1964. Foreign-flag rates for this trade declined during the third and fourth quarters of 1965, strengthening a conclusion that U.S.-flag rates are unrelated to their foreign-flag counterparts.

The low rates shown for both U.S.- and foreign-flag vessels in 1961 were found in many trades in which Public Law 480 grain moves, but is otherwise unexplained.

With the exceptions stated above, U.S.-flag rates from the North Pacific to the East Coast of India do not seem related to their U.S. Gulf counterparts or any other rates.

Average foreign-flag rates from the North Pacific to the East Coast of India varied from a low of \$6.12 in the third quarter of 1962 to a high of \$13.71 in the second quarter of 1965 (fig. 9). These rates were generally lower than their counterparts from the U.S. Gulf. The difference is less, however, than the difference between U.S.-flag rates to the East Coast of India from U.S. Gulf and North Pacific ports.

Except for an unusually steep rise in 1965, foreign-flag rates from North Pacific ports to the East Coast of India generally followed the typical pattern for foreign-flag rates from North American origins.

West Coast.--U.S.-flag rates from North Pacific ports to the West Coast of India ranged from \$13.62 in the second quarter of 1961 to \$28.32 in the fourth quarter of 1965 (fig. 10). These rates fluctuated much more widely than the other U.S.- or foreign-flag rates to India.

The difference in rates to ports on the East Coast of India and the West Coast of India is due to the previously discussed differences in discharge time and ease of navigation.

Except in 1962 and 1965, foreign-flag rates from North Pacific ports to the West Coast of India closely followed the pattern of foreign-flag rates to the East Coast and differed from these rates by only a few cents (fig. 9).

### Trends

The quarterly average rates for each trade were tested for trend by linear regression. Significant trends were found for only eight trades. All of these showed positive slopes. The following were found to be significant at the 1-percent confidence level: U.S. Gulf to East Coast of India by U.S.-flag vessels; U.S. Gulf to West Coast of India by U.S.-flag vessels; U.S. Gulf to Brazil by U.S.-flag vessels; North Pacific to East Coast of India by U.S.-flag vessels; and North Pacific to West Coast of India by U.S.-flag vessels.

The following trades were found to be significant at the 5-percent level: U.S. Gulf to Antwerp-Rotterdam-Amsterdam; U.S. Gulf to Brazil by foreign-flag vessels; and North Pacific to West Coast of India by foreign-flag vessels.

### INTERCORRELATION OF RATES

It was expected that similar changes in the rates for heavy grain shipments would be observed for all trade routes. This assumption was tested by comparing by linear regression the changes in quarterly average rates of each trade route with the changes in quarterly average rates of every other trade route. The hypothesis was accepted for any trade couplet showing a coefficient of determination ( $r^2$ ) of 0.500 or larger. In any such trade couplet, one-half of the variation in rate changes in one trade is explained by the variation in rate changes in the other trade.

The assumption did not prove true for trades carried by U.S.-flag vessels. None showed a coefficient of determination ( $r^2$ ) greater than 0.403. It was, therefore, concluded that the rates of U.S.-flag vessels operate independently of each other and of the market for foreign-flag vessels.

Considerable intercorrelation was found in the rates of foreign-flag vessels, but not enough to give unqualified acceptance to the assumption. It would appear that the rates of foreign-flag vessels are somewhat interdependent, with the rates for U.S. Gulf originating trades frequently serving as price setters.

Table 9 shows the origin-destination trade couplets for which changes in quarterly average rates in one of the trades appear to affect changes in the other. All relationships are for foreign-flag shipments.

The two trade couplets yielding the highest coefficients were Great Lakes to Antwerp-Rotterdam-Amsterdam and St. Lawrence to Antwerp-Rotterdam-Amsterdam,



Table 9.--Coefficients of determination between selected trade couplets 1/

Trade couplets <u>2/</u>	: Coefficient of : determination $r^2$
Great Lakes--UK and Great Lakes--A-R-A	: .630
Great Lakes--UK and St. Lawrence--UK	: .741
Great Lakes--UK and St. Lawrence--A-R-A	: .708
Great Lakes--A-R-A and St. Lawrence--UK	: .531
Great Lakes--A-R-A and St. Lawrence--A-R-A	: .952
St. Lawrence--UK and St. Lawrence--A-R-A	: .688
North Atlantic--A-R-A and North Atlantic--UK	: .574
North Atlantic--A-R-A and Gulf--Japan	: .583
North Atlantic--UK and Gulf--UK	: .714
North Atlantic--UK and Gulf--Japan	: .656
North Atlantic--UK and Gulf--Brazil	: .613
North Atlantic--UK and St. Lawrence--UK	: .654
Gulf--A-R-A and Gulf--Japan	: .508
Gulf--A-R-A and Great Lakes--UK	: .719
Gulf--A-R-A and St. Lawrence--A-R-A	: .579
Gulf--A-R-A and St. Lawrence--UK	: .605
Gulf--Japan and Gulf--West Coast India	: .695
Gulf--Japan and Gulf--Brazil	: .625
Gulf--Japan and St. Lawrence--UK	: .788
Gulf--West Coast India and Gulf--East Coast India	: .552
Gulf--West Coast India and North Pacific--West Coast India	: .600
Gulf--West Coast India and Great Lakes--UK	: .518
Gulf--West Coast India and St. Lawrence--UK	: .669
Gulf--West Coast India and St. Lawrence--A-R-A	: .543
Gulf--East Coast India and Gulf--Brazil	: .680
Gulf--East Coast India and North Pacific--West Coast India	: .509
Gulf--East Coast India and St. Lawrence--UK <u>2/</u>	: .643
Gulf--Brazil and Great Lakes--UK	: .670
Gulf--Brazil and Great Lakes--A-R-A	: .664
Gulf--Brazil and St. Lawrence--UK	: .839
Gulf--Brazil and St. Lawrence--A-R-A	: .822
Gulf--North Africa and North Pacific--Japan	: .509

1/ The last two quarters of 1965 were not available when the analysis was done. Inspection of the data reveals little probability of significantly increasing the coefficients of determination by including data for the third and fourth quarters of 1965.

2/ UK represents United Kingdom; A-R-A, Antwerp-Rotterdam-Amsterdam.

and U.S. Gulf to Brazil and St. Lawrence to United Kingdom. In the first trade couplet, the relationship is logical and surely exists. All ships voyaging to the Great Lakes have the option of calling at a St. Lawrence port without departing from their intended route. The Great Lakes and St. Lawrence ports are, therefore, quite likely to be highly competitive. Furthermore, other things being equal, grain from two port groupings could not be sold at the same destination unless the total transportation costs were nearly equal.

In the second trade couplet, U.S. Gulf to Brazil and St. Lawrence to United Kingdom, both the origins and the destinations are geographically separated. There is at least a possibility that the correlation is spurious.

With the exception of the U.S. Gulf to North Africa trade, rates for the trades originating in the U.S. Gulf are related to each other and to the rates associated with trades originating at other U.S. and Canadian ports. Rates to the United Kingdom from North Atlantic ports were also related to similar rates from U.S. Gulf origins.

In view of the large volume of export grain moving through the U.S. Gulf ports, it seems likely that the rates at these ports are major determinants of the rates from all other North American ports. The large number of U.S. Gulf originating trades found to be related to other trades substantiates such a hypothesis.

### CONCLUSIONS

It is apparent from the great difference between rates charged by U.S.-flag vessels and those charged by foreign-flag vessels that there are at least two markets for voyage-chartered ships carrying heavy grain. If there were a single market, the two sets of rates would have been more nearly equal. 8/

One market is composed of U.S.-flag vessels competing for the portion--at least one-half--of the Government-sponsored grain exports guaranteed them by the Cargo Preference Act of 1954 (68 Stat. 832). The high rates that prevail in this market, relative to those for foreign-flag vessels, make it unlikely that U.S.-flag vessels will exceed by more than a few percentage points their statutory guarantee of 50 percent of Government-sponsored grain exports.

The second market is composed of foreign-flag vessels competing for all privately sold export grain, and a portion--less than one-half--of the Government-sponsored export grain. Rates in this market show sharp absolute fluctuations as well as greater variations than those found in U.S.-flag rates. The relative stability of U.S.-flag rates is probably caused by statutory limitations upon the ocean shipping rates which may be paid for concessional sales.

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8/ Also see statement of Michael Klebanoff, Chairman, and Richard W. Kurrus, General Counsel, American Tramp Shipowners Association, before the House Subcommittee on Merchant Marine. 89th Cong., 2d Sess.; "Vietnam--Shipping Policy Review, Part 2;" Serial No. 89-19, U.S. Govt. Print. Off., Washington, D.C., 1966, p. 478.

# APPENDIX I. WEIGHTED AVERAGE OCEAN FREIGHT RATES, 1961-65

Table 10.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from Great Lakes origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas	
	United Kingdom	Antwerp-Rotterdam- Amsterdam
	<u>Dollars per long ton</u>	
1961:		
1st quarter .....	10.22	8.59
2nd quarter .....	7.96	7.30
3rd quarter .....	8.31	9.49
4th quarter .....	10.50	10.03
1962:		
1st quarter .....	9.23	8.23
2nd quarter .....	8.43	7.39
3rd quarter .....	5.98	6.29
4th quarter .....	7.79	---
1963:		
1st quarter .....	7.30	7.76
2nd quarter .....	6.80	8.19
3rd quarter .....	8.97	7.72
4th quarter .....	14.00	10.59
1964:		
1st quarter .....	10.50	8.04
2nd quarter .....	8.31	8.08
3rd quarter .....	7.76	7.44
4th quarter .....	10.72	8.70
1965:		
1st quarter .....	10.73	8.97
2nd quarter .....	8.92	8.72
3rd quarter .....	9.74	8.25
4th quarter .....	13.37	10.51

Table 11.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from St. Lawrence origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas	
	United Kingdom	Antwerp-Rotterdam- Amsterdam
	<u>Dollars per long ton</u>	
1961:		
1st quarter .....	6.11	4.49
2nd quarter .....	6.34	3.50
3rd quarter .....	6.54	4.92
4th quarter .....	6.82	5.72
1962:		
1st quarter .....	5.88	3.80
2nd quarter .....	5.19	3.75
3rd quarter .....	4.19	2.75
4th quarter .....	4.53	3.74
1963:		
1st quarter .....	5.17	3.75
2nd quarter .....	5.16	4.25
3rd quarter .....	6.40	4.41
4th quarter .....	8.19	6.87
1964:		
1st quarter .....	6.24	4.00
2nd quarter .....	5.92	4.04
3rd quarter .....	5.70	3.72
4th quarter .....	7.13	5.11
1965:		
1st quarter .....	7.27	4.39
2nd quarter .....	6.57	4.49
3rd quarter .....	6.45	4.96
4th quarter .....	6.56	6.22

Table 12.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from North Atlantic origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas		
	United Kingdom	:Antwerp-Rotterdam-: : Amsterdam :	North Africa
	<u>Dollars per long ton</u>		
1961:			
1st quarter .....	6.51	4.53	6.84
2nd quarter .....	7.17	7.88	7.35
3rd quarter .....	6.50	6.50	8.35
4th quarter .....	6.25	5.08	7.44
1962:			
1st quarter .....	5.46	3.84	7.91
2nd quarter .....	6.03	3.97	---
3rd quarter .....	4.02	2.94	4.34
4th quarter .....	4.58	3.62	9.57
1963:			
1st quarter .....	4.56	3.81	6.46
2nd quarter .....	---	4.50	---
3rd quarter .....	6.27	5.37	7.60
4th quarter .....	7.65	6.70	11.00
1964:			
1st quarter .....	5.99	4.90	8.08
2nd quarter .....	---	---	---
3rd quarter .....	5.19	4.62	7.96
4th quarter .....	6.75	5.70	---
1965:			
1st quarter .....	7.07	5.46	8.88
2nd quarter .....	7.48	---	6.50
3rd quarter .....	6.83	5.43	7.69
4th quarter .....	6.73	5.44	9.45



Table 13.--Weighted average ocean freight rates for heavy grain in voyage-chartered U.S.-flag vessels, from North Atlantic origins to North African ports, by quarters, 1961-65

Year and quarter	Ocean freight rates
	<u>Dollars per long ton</u>
1961:	
1st quarter .....	---
2nd quarter .....	---
3rd quarter .....	13.33
4th quarter .....	14.77
1962:	
1st quarter .....	15.46
2nd quarter .....	16.47
3rd quarter .....	15.24
4th quarter .....	15.04
1963:	
1st quarter .....	16.99
2nd quarter .....	15.01
3rd quarter .....	15.51
4th quarter .....	15.25
1964:	
1st quarter .....	---
2nd quarter .....	13.25
3rd quarter .....	13.79
4th quarter .....	---
1965:	
1st quarter .....	15.56
2nd quarter .....	---
3rd quarter .....	17.40
4th quarter .....	---

Table 14.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from U.S. Gulf origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas						
	North	East	West			Antwerp-	United
	Africa	Coast	Coast	Japan	Brazil	Rotterdam- :Amsterdam	Kingdom
----- <u>Dollars per long ton</u> -----							
1961:							
1st quarter	---	10.32	9.67	9.73	7.29	4.39	7.94
2nd quarter	7.12	10.85	10.27	11.30	7.02	3.79	8.25
3rd quarter	8.12	10.85	9.53	11.38	7.78	4.63	8.08
4th quarter	8.01	10.40	9.27	10.53	8.00	4.88	7.78
1962:							
1st quarter	6.16	8.18	8.47	9.06	6.43	4.12	5.60
2nd quarter	7.03	8.83	7.72	8.18	6.61	4.16	6.67
3rd quarter	5.25	7.53	7.54	6.92	5.46	3.51	4.21
4th quarter	6.32	7.80	7.87	6.80	6.20	3.99	4.70
1963:							
1st quarter	6.88	12.53	8.88	7.33	7.12	4.61	5.30
2nd quarter	7.55	9.95	9.61	8.41	7.62	4.57	6.71
3rd quarter	7.30	10.79	9.66	10.19	9.02	5.38	8.91
4th quarter	10.59	14.32	13.54	13.37	12.87	6.84	8.79
1964:							
1st quarter	12.89	11.02	10.69	10.94	8.88	5.96	7.16
2nd quarter	8.20	12.05	10.60	9.66	9.42	4.57	6.98
3rd quarter	8.17	11.77	10.34	9.83	7.85	5.04	5.84
4th quarter	10.25	12.28	13.24	11.23	10.05	5.73	8.19
1965:							
1st quarter	8.38	12.54	12.10	11.68	10.10	5.48	8.31
2nd quarter	8.13	13.78	12.41	10.77	---	4.59	7.90
3rd quarter	9.03	13.94	12.62	12.70	10.58	5.75	9.88
4th quarter	10.96	14.03	13.47	12.41	9.60	5.82	9.22

Table 15.--Weighted average ocean freight rates for heavy grain in voyage-chartered U.S.-flag vessels, from U.S. Gulf origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas			
	North	East Coast	West Coast	Brazil
	Africa	India	India	
	<u>Dollars per long ton</u>			
1961:				
1st quarter ...:	17.37	27.47	18.45	17.28
2nd quarter ...:	15.52	23.85	15.20	12.38
3rd quarter ...:	14.89	25.06	17.53	15.36
4th quarter ...:	15.56	26.49	24.51	16.36
1962:				
1st quarter ...:	15.94	25.98	16.74	---
2nd quarter ...:	15.61	27.78	20.10	16.87
3rd quarter ...:	15.94	26.93	18.46	14.65
4th quarter ...:	16.03	28.40	21.30	15.88
1963:				
1st quarter ...:	16.47	28.46	21.97	18.25
2nd quarter ...:	17.60	28.70	22.60	20.00
3rd quarter ...:	15.79	30.08	23.86	---
4th quarter ...:	17.99	31.25	26.07	19.91
1964:				
1st quarter ...:	17.38	30.99	26.29	16.75
2nd quarter ...:	14.25	31.02	25.75	17.07
3rd quarter ...:	16.09	31.15	26.08	19.13
4th quarter ...:	18.60	31.32	26.46	19.56
1965:				
1st quarter ...:	17.02	31.37	26.44	---
2nd quarter ...:	14.93	31.24	21.94	---
3rd quarter ...:	17.64	30.91	24.82	---
4th quarter ...:	---	31.34	28.07	19.86

Table 16.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from North Pacific origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas			
	East Coast	West Coast	Japan	
	India	India		
	<u>Dollars per long ton</u>			
1961:				
1st quarter	9.85	9.42	6.47	
2nd quarter	9.26	8.27	6.79	
3rd quarter	8.43	8.22	6.53	
4th quarter	8.05	7.77	6.48	
1962:				
1st quarter	8.32	7.49	6.20	
2nd quarter	8.26	6.25	5.13	
3rd quarter	6.12	6.75	4.57	
4th quarter	8.32	8.22	5.70	
1963:				
1st quarter	10.17	9.38	6.33	
2nd quarter	---	---	5.84	
3rd quarter	9.11	9.38	6.23	
4th quarter	11.26	11.79	7.58	
1964:				
1st quarter	9.91	9.22	8.08	
2nd quarter	9.45	9.35	6.74	
3rd quarter	---	---	6.51	
4th quarter	10.61	10.75	7.05	
1965:				
1st quarter	12.84	11.56	8.37	
2nd quarter	13.71	11.00	8.02	
3rd quarter	12.25	11.28	8.44	
4th quarter	12.06	11.73	8.27	

Table 17.--Weighted average ocean freight rates for heavy grain in voyage-chartered U.S.-flag vessels, from North Pacific origins to selected destination areas, by quarters, 1961-65

Year and quarter	Destination areas	
	East Coast	West Coast
	India	India
	<u>Dollars per long ton</u>	
1961:		
1st quarter .....	23.47	18.70
2nd quarter .....	23.70	13.62
3rd quarter .....	22.60	---
4th quarter .....	25.34	17.85
1962:		
1st quarter .....	25.50	---
2nd quarter .....	24.45	---
3rd quarter .....	24.03	18.58
4th quarter .....	24.22	21.68
1963:		
1st quarter .....	26.68	24.15
2nd quarter .....	---	---
3rd quarter .....	25.88	23.77
4th quarter .....	25.10	25.09
1964:		
1st quarter .....	25.63	22.11
2nd quarter .....	26.70	21.21
3rd quarter .....	24.88	26.75
4th quarter .....	26.21	27.48
1965:		
1st quarter .....	25.97	23.74
2nd quarter .....	27.38	20.20
3rd quarter .....	28.00	24.43
4th quarter .....	28.21	28.32



# APPENDIX II. WEIGHTED AVERAGE OCEAN FREIGHT RATES, 1966

Table 18.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from Great Lakes origins to selected destination areas, by quarters, 1966

Year and quarter	Destination areas	
	United Kingdom	Antwerp-Rotterdam-Amsterdam
	Dollars per long ton	
1966:		
1st quarter .....	10.20	9.85
2nd quarter .....	10.92	8.25
3rd quarter .....	7.99	6.24
4th quarter .....	9.28	7.79

Table 19.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from St. Lawrence origins to selected destination areas, by quarters, 1966

Year and quarter	Destination areas	
	United Kingdom	Antwerp-Rotterdam-Amsterdam
	Dollars per long ton	
1966:		
1st quarter .....	8.86	4.80
2nd quarter .....	5.78	3.50
3rd quarter .....	7.36	3.13
4th quarter .....	5.03	3.85

Table 20.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from North Atlantic origins to selected destination areas, by quarters, 1966

Year and quarter	Destination areas		
	United Kingdom	Antwerp-Rotterdam-Amsterdam	North Africa
	Dollars per long ton		
1966:			
1st quarter .....	6.58	4.69	10.04
2nd quarter .....	5.91	4.28	8.40
3rd quarter .....	---	3.00	---
4th quarter .....	4.49	---	---

Table 21.--Weighted average ocean freight rates for heavy grain in voyage-chartered U.S.-flag vessels, from North Atlantic origins to North African ports, by quarters, 1966

Year and quarter	:	Ocean freight rates
	:	----- <u>Dollars per long ton</u> -----
1966:	:	
1st quarter .....	:	---
2nd quarter .....	:	14.98
3rd quarter .....	:	---
4th quarter .....	:	---

Table 22.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from U.S. Gulf origins to selected destination areas, by quarters, 1966

Year and quarter	:	Destination areas						
		North Africa	East Coast India	West Coast India	Japan	Brazil	Antwerp-Rotterdam-Amsterdam	United Kingdom
	:	----- <u>Dollars per long ton</u> -----						
1966:	:							
1st quarter :	:	8.39	14.40	13.00	11.70	8.91	5.30	8.07
2nd quarter :	:	6.41	13.44	11.61	9.75	6.94	3.90	6.92
3rd quarter :	:	---	11.37	10.78	9.68	6.39	3.53	5.97
4th quarter :	:	---	12.57	11.71	9.25	6.34	4.12	6.25

Table 23.--Weighted average ocean freight rates for heavy grain in voyage-chartered U.S.-flag vessels, from U.S. Gulf origins to selected destination areas, by quarters, 1966

Year and quarter	:	Destination areas				
		North Africa	East Coast India	West Coast India	Brazil	
	:	----- <u>Dollars per long ton</u> -----				
1966:	:					
1st quarter :	:	16.26	---	29.04	---	
2nd quarter :	:	16.57	30.25	26.98	---	
3rd quarter :	:	---	28.69	26.96	---	
4th quarter :	:	---	33.47	29.41	---	

Table 24.--Weighted average ocean freight rates for heavy grain in voyage-chartered foreign-flag vessels, from North Pacific origins to selected destination areas, by quarters, 1966

Year and quarter	Destination areas		
	East Coast	West Coast	Japan
	India	India	
	<u>Dollars per long ton</u>		
1966:			
1st quarter .....	12.91	12.51	8.39
2nd quarter .....	11.62	10.87	7.67
3rd quarter .....	10.01	8.75	7.15
4th quarter .....	9.65	9.99	7.30

Table 25.--Weighted average ocean freight rates for heavy grain in voyage-chartered U.S.-flag vessels, from North Pacific origins to selected destination areas, by quarters, 1966

Year and quarter	Destination areas	
	East Coast India	West Coast India
	<u>Dollars per long ton</u>	
1966:		
1st quarter .....	---	27.40
2nd quarter .....	---	---
3rd quarter .....	25.45	26.34
4th quarter .....	29.25	27.98



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